SEGMENTING SMES: NET ZERO OPPORTUNITIES AND CHALLENGES FOR UK BAKERY ENTREPRENEURS

UPGRADE PRESENTATION – 23 MARCH 2022

Peter Roscoe, post graduate student (self funded PhD research)

Principal supervisor: Dr Kathryn Janda; Subsidiary supervisor: Prof Paul Ruyssevelt

Independent panel member: Dr Rokia Raslan

CONTENTS

- **Introduction**
- Literature Review
- Methodology
- Emerging Findings
- Planning the rest of the research

WHY IS THIS RESEARCH NEEDED?

- Big gap between SME energy and emissions and the path to zero carbon.
- EEMs available and often economic – but mostly not taken up,
  - Including: day-to-day management, heating (space and process), motors.
- Understanding more about the enterprises in sub-sectors could inform policy decisions

Notes: SME=Small & medium sized enterprise

EEM = Energy efficiency measures (EEMs) are defined as strategies (technical or social) that either, allow the enterprise to produce the same output for less energy input, or to produce the same output at a lower energy cost, i.e. using cheaper energy.

SME ENERGY EFFICIENCY

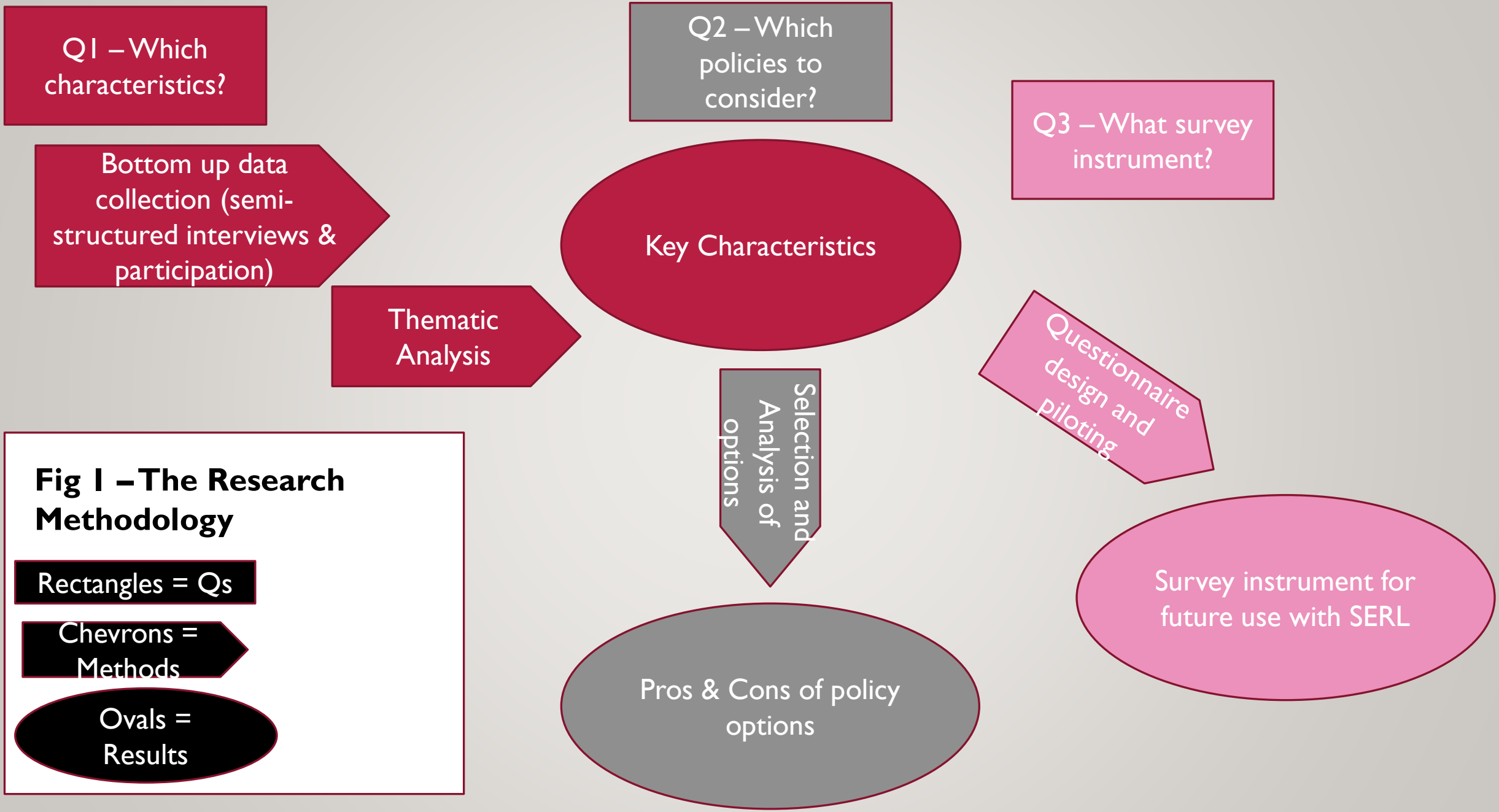
- Extensive evidence gaps around SME energy and emissions:
  - "…energy use and emissions by business size, sector, building and occupancy type, activity, and location." (Blundel and Hampton 2021)
  - which segments have the highest energy and emissions? or
  - what mitigation should be expected from each segment?
- UK Government (as others) has only limited policies and little idea about impacts.

Blundel and Hampton (2021), "How Can SMEs Contribute to Net Zero?: An Evidence Review." State of the art review No 51, Enterprise Research Centre

WHY RESEARCH SMALL BAKERY ENTERPRISES?

- Manufacturing and retail
- Potentially significant energy use
- Accessible during the Covid crisis
- *Potential future SERL SME research*

SERL= Smart Energy Research Laboratory


Q1 – Which characteristics?
Q2 – Which policies to consider?
Q3 – What survey instrument?
Bottom up data collection (semi-structured interviews & participation)
Key Characteristics
Thematic Analysis
Selection and Analysis of options
Questionnaire design and piloting
Pros & Cons of policy options
Survey instrument for future use with SERL
Fig 1 – The Research Methodology
Rectangles = Qs
Chevrons = Methods
Ovals = Results

CONTENTS

- Introduction
- **Literature Review**
- Methodology
- Emerging Findings
- Planning the rest of the research

MANAGEMENT LITERATURE

- Theory of the firm primarily about the management of large enterprises
- The entrepreneur's individual characteristics (Schumpeter 1983) – synonymous with the enterprise
- Empirical work – mainly quantitative and around larger enterprises (Bloom and Van Reenan 2007)

Schumpeter, J. A. (1983). The theory of economic development : an inquiry into profits, capital, credit, interest, and the business cycle **
Bloom, N. and J. Van Reenen (2007). Measuring and Explaining Management Practices across Firms and Countries***

MANAGEMENT OF ENERGY LITERATURE

- Market failures and barriers seen as stop on EEM investment (DECC 2012) particularly:
  - Information related;
  - Externalities;
  - Principal agent problem
  - Access to finance
- but remedies not working for SMEs (Janda 2014)(Fawcett and Hampton 2020)
- Since 2007 economic sociology inspired approaches:
  - "…the interpenetration of different spheres of social life…Beliefs, social structure, culture, power relations, and other noneconomic considerations are often imbricated in energy decisions..." (Biggart and Lutzenhiser 2007)

DECC (2012). Factors influencing energy behaviours and decision-making in the non-domestic sector

Janda, K. B., et al. (2014). Learning from the "data poor": Energy management in understudied organizations

Fawcett, T. and S. Hampton (2020). Why & how energy efficiency policy should address SMEs.

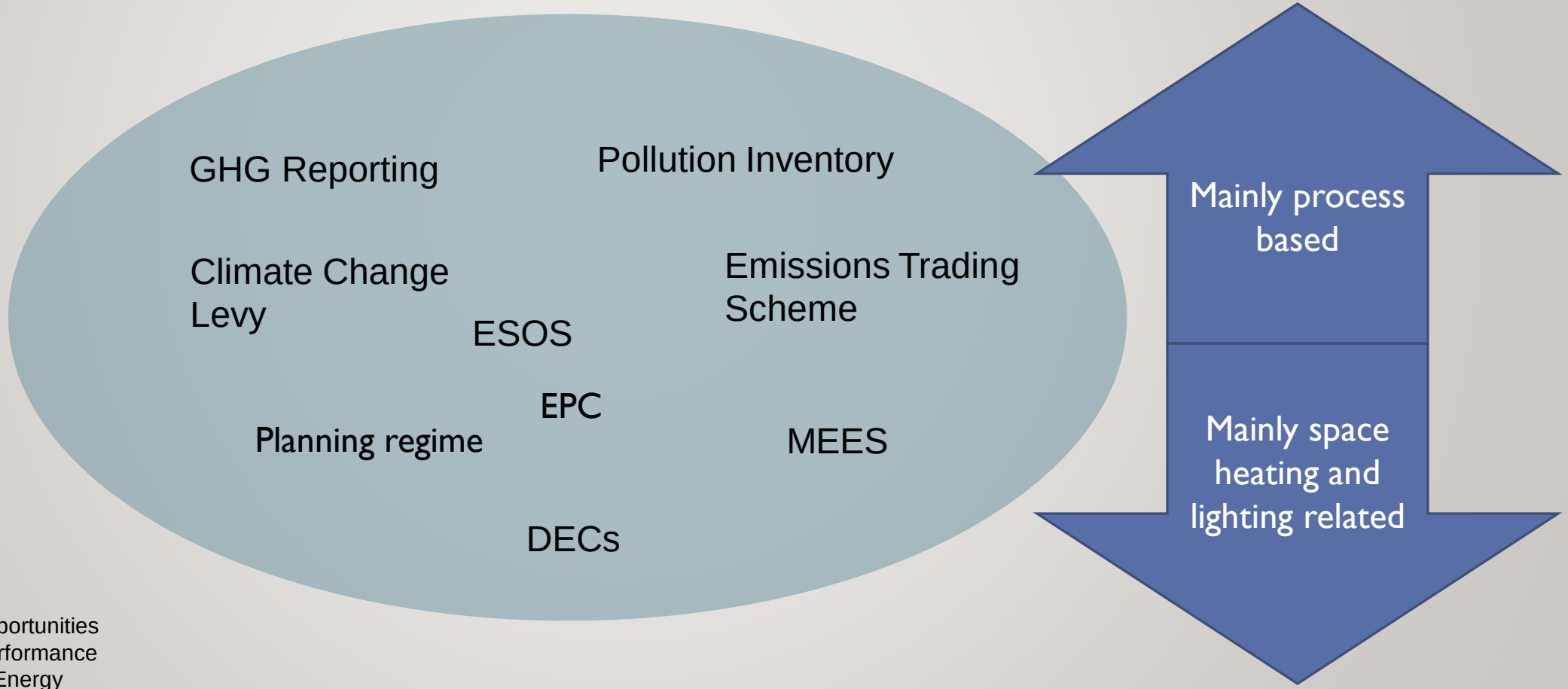
Biggart, N. W. and L. Lutzenhiser (2007). Economic Sociology and the Social Problem of Energy Inefficiency.

UK ENTERPRISE NUMBERS

- 7,700 large enterprises (BEIS 2021)
- 35,000 medium (BEIS 2021)
- c.1-2 million SMEs operating in non-domestic buildings

BEIS 2021 Business Population Estimates

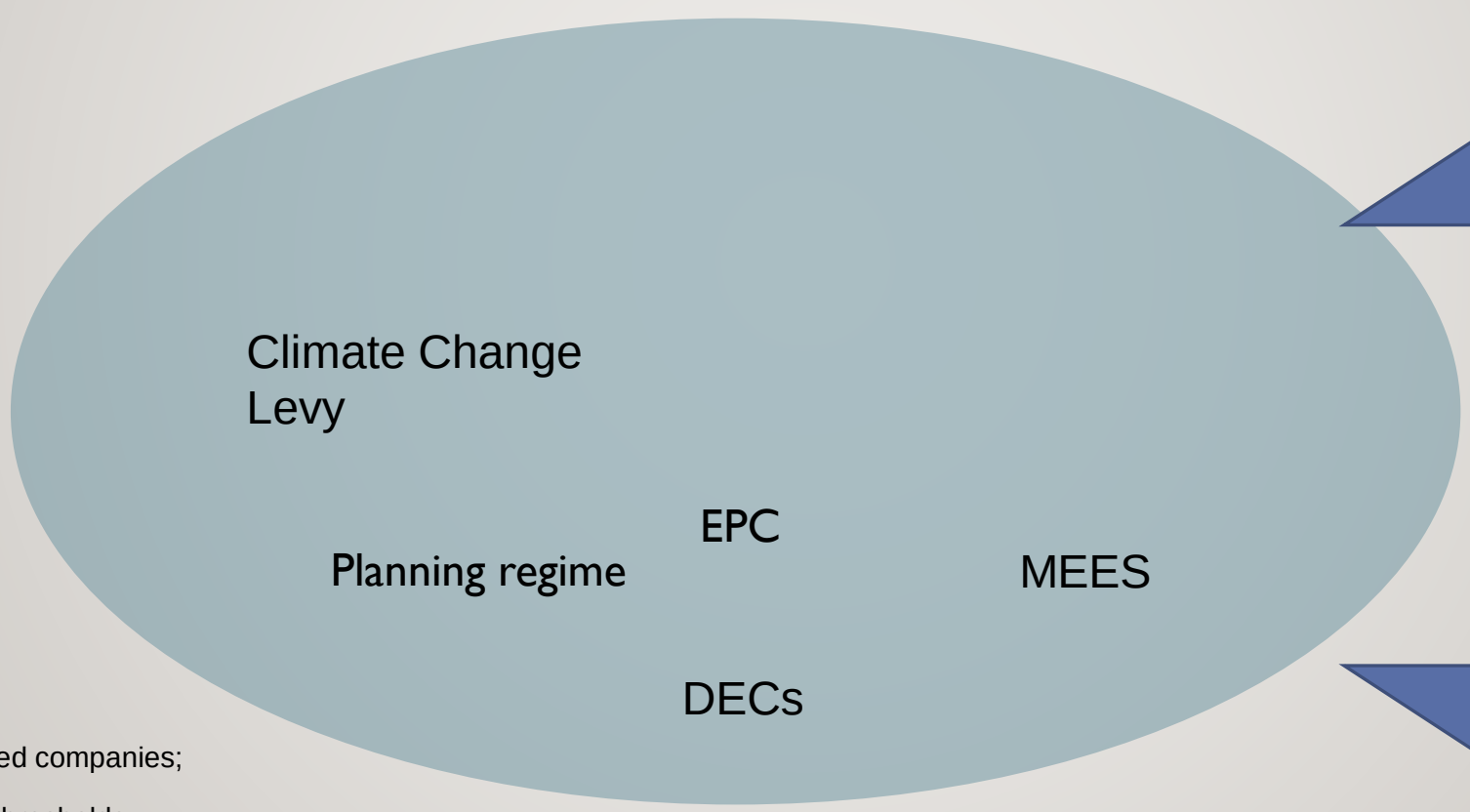
LARGE ENTERPRISE MANDATORY ENERGY EFFICIENCY RELATED POLICIES

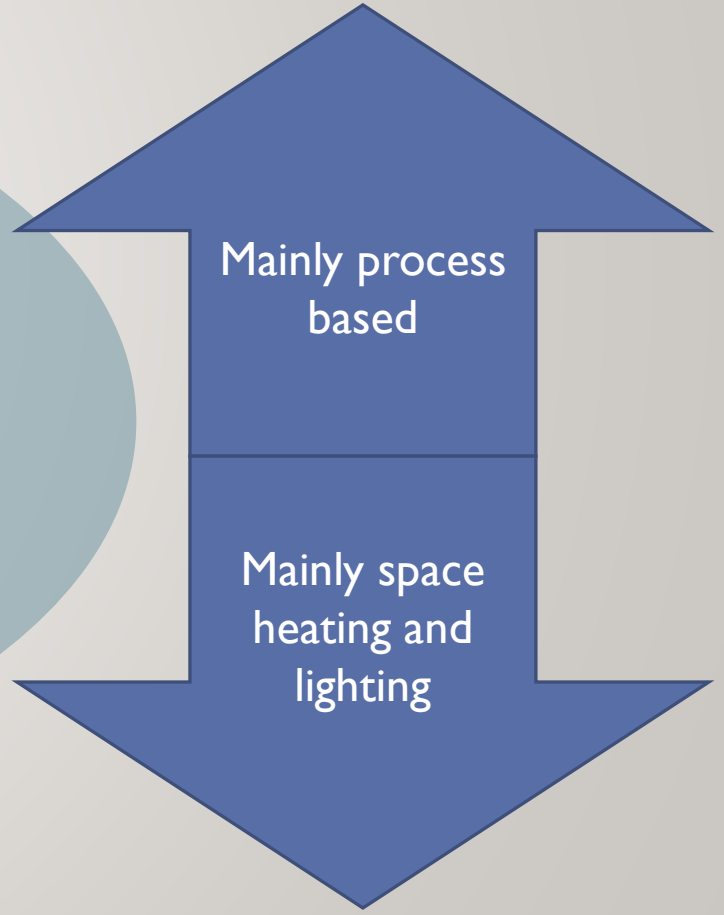


Abbreviations:

ESOS=Energy Saving Opportunities Scheme, EPC=Energy Performance Certificate, DEC=Display Energy Certificate

SME MANDATORY ENERGY EFFICIENCY RELATED POLICIES





Notes:

GHG reporting is for listed companies;

Pollution inventory has thresholds

CCL imposed above 1 MWh electric per month

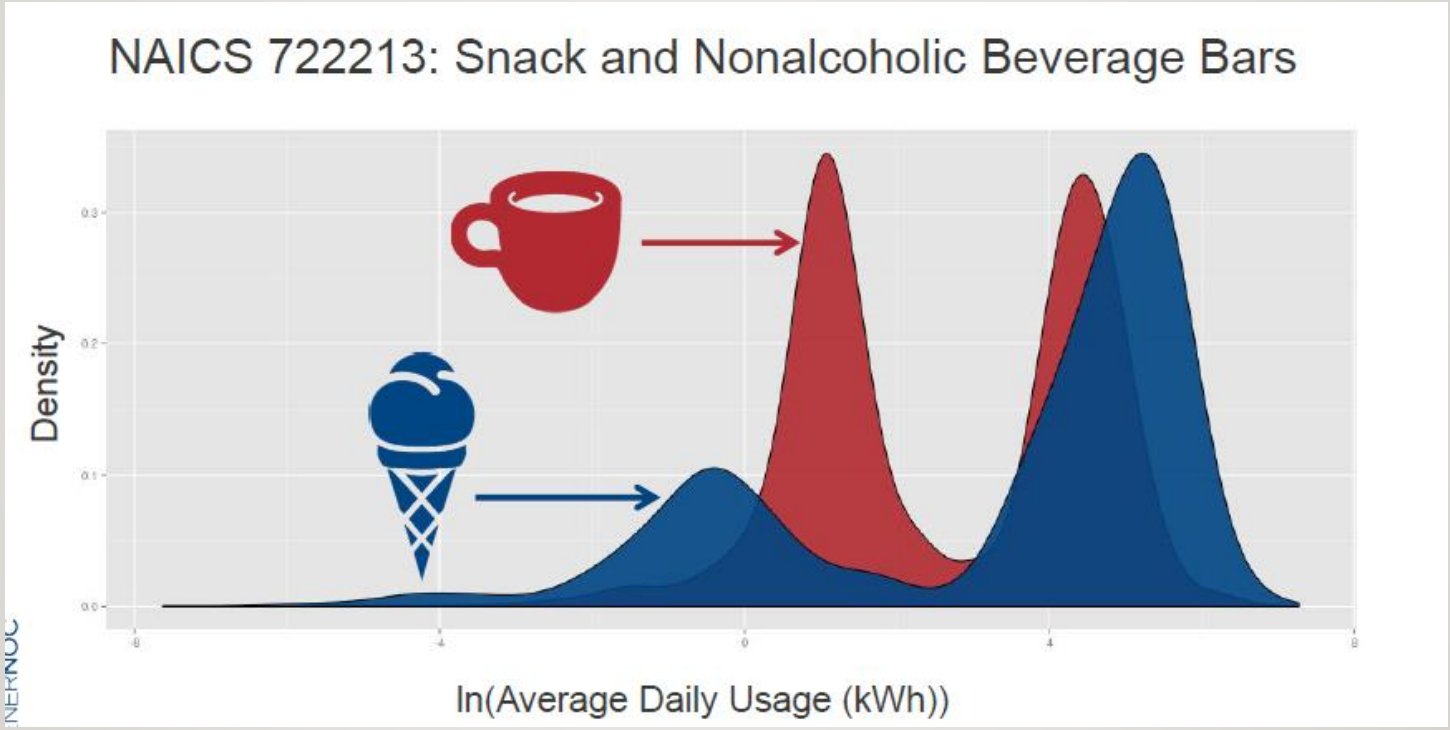
SME ENERGY EFFICIENCY

- "an implementation rate of just 25% for opportunities with cost savings over £10,000 per annum" (DECC 2014)
- But 92% had energy bills of less than £1000 per annum in 2010. (Fawcett. 2010)

DECC (2014). Barriers to Energy Efficiency, UK Government.

Fawcett, J. (2010). Unconstrained Sector Research, UK Government

HETEROGENEITY WITHIN SECTORS



Notes:

Figure from Hardjasa, A. (2014) Classification of Business Categories for Small and Medium Enterprises, Behavior Energy and Climate Change conference

NAICS= North American Industry Classification System

LARGE BAKERY ENTERPRISES

- science-led industrial baking
- achieving high utilisation rates
- continuous processes
- bespoke plant and equipment, monitored and adapted to improve efficiency
- Combined heat and power

SMALL BAKERY ENTERPRISES

- hand-made, craft approach
- batch production methods
- low utilisation rates.
- equipment off the shelf (usually with no energy rating)
- Product prices are around 4 or 5 times more than supermarkets
- Between 4,500 (Euromonitor International 2014) and 800 SMEs (Witney 2019)

Euromonitor International (2014) “Baked Goods in the United Kingdom”

Witney (2019) “Baker Production Industry, Sector Report”

ANALYTICAL FRAMEWORK – EEM RELEVANT FINDINGS FROM LITERATURE

Dimensions of influence\Cs	Concern (factors that shape attention to energy)	Conditions (factors that shape where energy actions occur)	Capacity (factors that moderate abilities to take energy actions)
Government	CCAs	Product regulations	
Product Market	Consumer values	Competition	
Communities	Energy advisers; peer group; family control.		Access to finance. Information on energy efficiency. Access to advisers
Entrepreneur	ESG values; business-led or practice-led; openness; conscientiousness;	Point in the business cycle (inc. size); premises tenancy.	Primogeniture; affordable loss; bounded rationality; Prospect theory trap.

Table based on: Janda, K. B. (2014). "Building communities and social potential: Between and beyond organizations and individuals in commercial properties.", Energy Policy and Kenington, D., et al. (2020). "Encouraging energy efficiency in united kingdom independent retail? The case of the butcher, fishmonger and cycle-shop", Energy Research and Social Science

LITERATURE REVIEW - GAPS

- Management of energy literature **does not** explain small enterprise energy use.
- Insights from entrepreneurial theory **not** applied significantly to management of energy theory.
- **Little** qualitative evidence on SME's energy decision making.

CONTENTS

- Introduction
- Literature Review
- **Methodology**
- Emerging Findings
- Planning the rest of the research

METHODOLOGY – RESEARCH DESIGN

- Little existing evidence to build a quantitative approach on.
- Initial qualitative in-depth investigation sharpens research questions for later quantitative work (Factor and Ulhoi 2021)
- Reflect on own subjectivity and adjust to understand (Vindrola-Padros 2021)

Factor A and JP Ulhoi Chapter 3 “Mapping the existing methodological SME and sustainability landscape" in (Eds) Factor, A. and JP Ulhoi (2021). Sustainability and Small and Medium-Sized Enterprises.

Vindrola-Padros, C. (2021). “Rapid ethnographies : a practical guide”, Cambridge University Press

Q1 – Which characteristics?

Q2 – Which policies to consider?

Q3 – What survey instrument?

Bottom up data collection: semi-structured interviews; participation & energy data

Thematic Analysis

Key Characteristics

Selection and Analysis of options

Questionnaire design and piloting

Pros & Cons of policy options

Survey instrument to segment SMEs for future use with SERL

Fig 1 – The Research Process

Rectangles = Qs

Chevrons = Methods

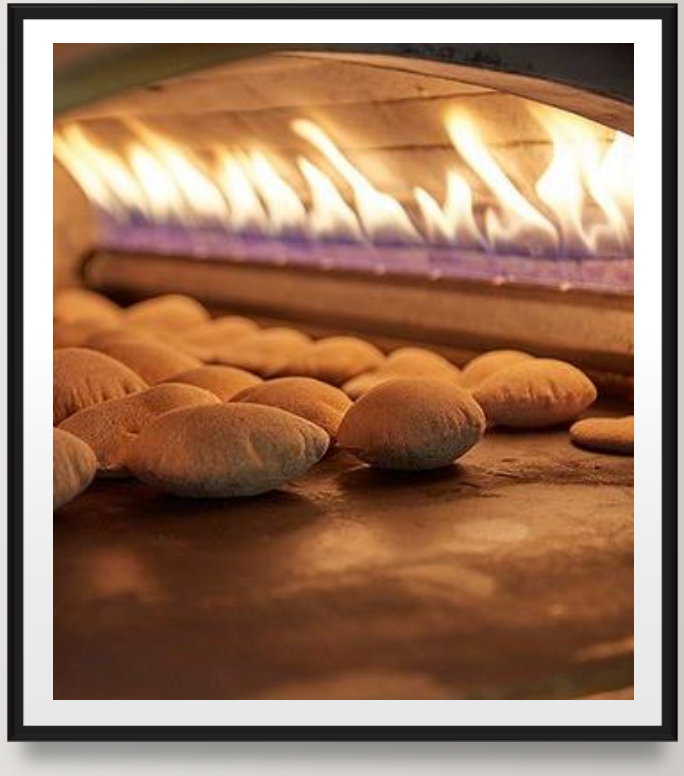
Ovals = Results

RESEARCH QUESTIONS

- Q1:What characteristics are, or potentially are, associated with EEM take up at the small enterprise?.
- Q2: Which policies or support might improve EEM take-up by small bakery (and similar) enterprises?
- Q3: What survey instrument would be appropriate to capture important energy related characteristics of small enterprises?

METHODS - QUESTIONS 1 & 2

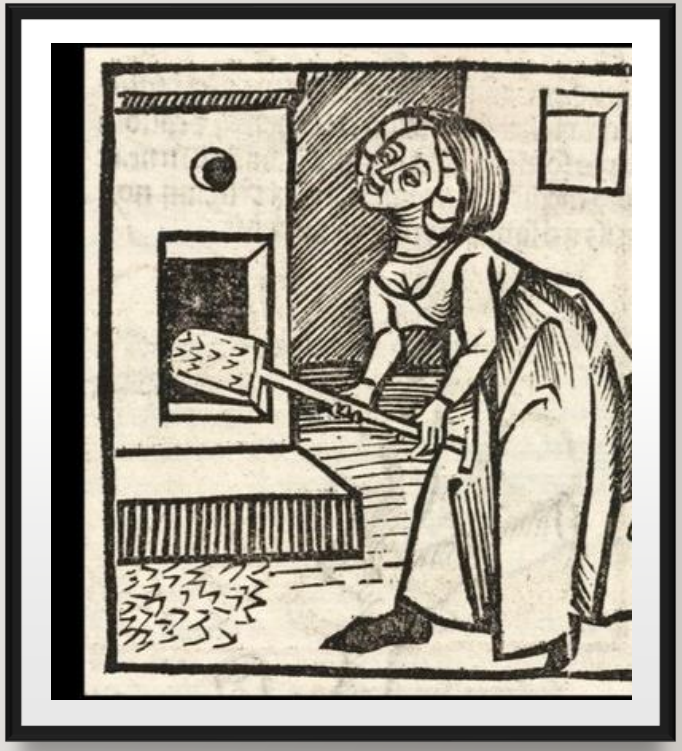
- Qualitative approach: in depth semi-structured interviews and participation sessions. To unpack the complexities of small enterprise life and energy use
- Participatory visits . "...new knowledge is retained better if experienced..."(Gagnon 2021) More aspects of the bakers' stories and characteristics can be explored,
- Acting as a sounding board for energy-related innovations and risks that the bakers discuss.



Gagnon M, chapter 5 "Qualitative to quantitative and back: Reflecting on mixed methods approach for examining sustainability and small business" in (Eds) Factor, A. and JP Ulhoi (2021). "Sustainability and Small and Medium-Sized Enterprises."

METHODS - THEMATIC ANALYSIS

- The complexity of the bakery-enterprise environment interpreted using a reflexive thematic analysis approach. (Braun and Clarke 2021)
- The results will be categorised and compared with the results of the literature review in an adapted 4Cs framework (table above)



(Braun, V. and V. Clarke (2021). "Conceptual and design thinking for thematic analysis." Qualitative Psychology.

METHODS - BENCHMARKS

- Collecting flour and energy data (including from building stock model)
- Constructing energy benchmarks – difficult to compare between enterprises as mix of activities is different.
- Perhaps composite targets that "...[are] related to consumption drivers and proven good practices for similar buildings and operations" (Morgenstern, P., et al. (2016))

Morgenstern, P., et al. (2016). "Benchmarking acute hospitals: Composite electricity targets based on departmental consumption intensities", Energy and Buildings.

METHODS - QUESTION 3 – WHAT SURVEY PILOT TO TEST?

- Trialling a survey instrument with the participants
- Based on the emerging themes from the earlier work
- Parallel to SERL household research
- Produce a segmentation of SMEs useful for policy development.

Notes:

SERL = Smart Energy Research Laboratory

CONTENTS

- Introduction
- Literature Review
- Methodology
- **Emerging Findings**
- Planning the rest of the research

EMERGING RESULTS WITH POLICY RELEVANCE

- Renewable energy more attractive than EEM for some
- Better insulation is important for oven performance
- Data on energy-efficiency performance - not shared by manufacturers – or even requested by most bakers.
- Hostile to bank finance, but paradoxically happy with Government guaranteed loans and equipment-supplier credit

CONTENTS

- Introduction
- Literature Review
- Methodology
- Emerging Findings
- **Planning the rest of the research**

WHAT'S THE PLAN?

Table 4 Gant chart for completion of PhD	Autumn 2020	Summer 2021	Winter 2021/22	Spring 2022	Summer 2022	Summer 2023	Spring 2024	Autumn 2026
Initial research objectives								
Initial Literature review								
Ethical approval								
Upgrade & literature review								
Interview & participation phase								
Develop and pilot survey instruments								
Collect and analyse bakery energy and other data								
Final report								
Final archiving								

CONTACT DETAILS

- Thanks for taking part
- Peter.roscoe.20@ucl.ac.uk

CONTENTS

- Annex

PARTICIPANTS - LOCATION OF CONTACTS & INTERVIEWEES

Location	Bakery enterprises or advisers contacted	Number interviewed
South London	32	7
Other London	13	0
Rest of UK	11	5
Total	56	12

HOW PARTICIPANTS WERE INTRODUCED

How introduced	interviewed
Researcher direct	5
Friend/relative	3
Article for Real Bread Campaign	3
Snowball	1
Total	12